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ABSTRACT

Environmental education provides an interdisciplinary approach to connect various curriculum areas, such as science, mathematics, social studies, and reading. This study sought to discover if intermediate grade students who had instruction in environmental education were more positive toward the school curriculum than those who have not. Fourteen intermediate classrooms were involved in at least 10 of 12 environmental education activities that were provided to the teachers by the researcher. These activities were taken from the Project Learning Tree, Project WILD, and Outdoor Biology Instructional Strategies programs (OBIS). An additional 14 classrooms served as the control group, and received no such instructional activities. Results of pretesting and posttesting both the experimental and control groups indicated that the students in the experimental group developed a more positive attitude toward science and social studies after experiencing the environmental education instructional activities. Recommendations for further research and implications of this study are discussed. (TW)

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ENVIRONMENTAL EDUCATION AND ITS EFFECTS ON STUDENTS' ATTITUDES TOWARD THE CURRICULUM

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Denece Gleed Schwartz

A thesis submitted in partial fulfillment of the requirements for the degree of

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IN

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CHAPTER 1

INTRODUCTION

Environmental education instruction is an area of curriculum that is gaining support as an issue in the public school system (James & Potts, 1981). As the population increases, it is very important to preserve our natural resources and respect our environment.

The effects of environmental education instruction are impacting various curriculum areas such as reading, math, science, and social studies. Environmental education instruction provides the world as a classroom that isn't segregated into specific subject areas. There are no artificial boundaries between the subjects that are often present in the classroom (Staley, 1979). A positive attitudinal change in many areas of the curriculum have been detected in students who have experienced environmental education instruction (Thomson, 1974). This thesis will address the issue of how environmental education affects students' attitudes toward the school curriculum.

Research Question

Do students in the fourth, fifth, and sixth grades who have had environmental education instruction have a

more positive attitude toward the school curriculum than those who have not?

Significance of Problem

The 18th Annual Gallup Poll of the American public's attitudes toward the public schools taken in 1986 revealed that students' lack of interest or motivation was a national concern (Gallup, 1986). "Students who are unmotivated to learn do not learn" (Slavin, p. 53).

Negative attitudes are expressed in the subject areas of reading (DiSibio & Savitz, 1983), math (Reyes, 1984), and social studies (Schug, Todd & Beery, 1985). An area that is of particular concern among many teachers and administrators is the negative attitude toward science that is displayed by many students in grades four through six (Rakow, 1984). This negative attitude makes the teaching of science difficult and because of this negativism, science is often slighted in the elementary curriculum. Environmental education instruction may provide a source for stimulating interest in science because it emphasizes familiar settings. The traditional science curriculum deals primarily with unfamiliar surroundings and lectures instead of a "hands on" approach.

Definition of Terms

The following definition is provided for the reader's understanding of the theoretical development:

> Environmental education- Environmental education is a learning process concerned with the interrelationship with and between the various components of the natural and human-made world producing growth in the individual and leading to a responsible stewardship of the earth (Pennsylvania State Dept. of Education, 1985, p. 52). The term environmental education will be used interchangeably with outdoor education in the literature review.

Positive Effects of Environmental Education Instruction

Research indicates that students are experiencing a positive side-effect in their general attitudes toward the school curriculum resulting from the environmental education instruction (Thomson, 1974).

The New York City Board of Education implemented the Goddard-Riverside Educational Camp Program for their students. After experiencing environmental education instructional activities, the students showed growth in many areas such as science, writing skills, self-esteem, and social relations. The participants

were given pre- and post-tests on scientific concepts and writing skills. There was a significant increase on the post-test scores of both subjects (Robin, 1976).

It is generally accepted when students perform better in a particular subject area, then their attitudes are more positive. A program in another geographic region indicates student academic gains in the area of science and other subject areas. An extensive environmental program was conducted in the British Columbia area in various school districts. After incorporating environmental education instruction into the curriculum, the students made significant gains on a science achievement test, according to pre- and post-test mean gain scores (Conry & Jeroski, 1982).

In a study done by Jonnson (1981), he suggests students traditionally have a poor attitude toward science. He also states that emphasis on environmental issues and outdoor activities help to promote positive attitudes in science.

If this research is valid, then teachers should consider implementing environmental education instruction into their curriculum. Studies, which will be reviewed in Chapter Two, suggest student attitudes

toward the school curriculum are more positive as a result of environmental education instruction.

Hypotheses

If the above reasoning is sound then this writer would expect to reject the following null hypotheses:

1. Environmental education instruction would have no effect on students' attitudes toward the school curriculum.
2. Environmental education instruction would have no effect on students' attitudes toward reading.
3. Environmental education instruction would have no effect on students' attitudes toward math.
4. Environmental education instruction would have no effect on students' attitudes toward science.
5. Environmental education instruction would have no effect on students' attitudes toward social studies.

Organizational Design

Chapter Two contains a literature review on environmental education instruction and what effects are observed.

Chapter Three reports the methods and procedures used for collecting data and describes the sample. It also explains the statistical design employed.

Chapter Four discusses the results of this research as it relates to the hypotheses.

Chapter Five reports conclusions, implications of the results, and recommendations.

CHAPTER 2

REVIEW OF RELATED LITERATURE

This section will review the literature in the areas of history of environmental education, effects of environmental education instruction, and students' attitudes toward the school curriculum.

History of Environmental Education

Although it would be impossible to cover the entire history of environmental education, this section will report the major developments that have occurred.

Smith (1972), an expert in the area of outdoor education, summarized the progress of environmental education up to 1970. Prior to 1940, the groundwork was laid for environmental education under such labels as field and camping trips, outings, recreation, and camping education. Hammerman and Hammerman (1973) refer to this time as the Period of Inception. Camping education was used as a laboratory to expand the function of the school to develop the "whole child" concept.

In 1940-1950 the term outdoor education was used to describe the activities which took place at resident outdoor schools. Students would stay at the resident

outdoor schools for a period of time which generally ranged from two days to one week (Smith, 1972). This is referred to as the Experimentation Period (Hammerman & Hammerman, 1973) when educators were expanding and enriching the curriculum. A shift was seen in the concept of outdoor education from an extracurricular, summer activity to a justifiable component of the school curriculum.

The 1950's experienced a growth in outdoor teacher education when the Outdoor Education Project of the American Association for Health, Physical Education, and Recreation was intiated (Smith, 1972). This program served as a catalyst for interest and leadership in outdoor education. Several components helped to contribute to the impact of the Outdoor Education Project. Leadership programs were established for teachers, recreation leaders, and graduate students in the form of outdoor education workshops. More districts were beginning to establish outdoor schools which allowed students to spend one week in a camp setting to participate in outdoor education activities. Support was gained at the state and national levels, with workshops, conventions, and conferences being offered (Smith, 1973).

The Elementary and Secondary Education Act passed in the 1960's allowed for federal funding of fifty outdoor education programs. Growth was shown in many areas of outdoor education during this time. Outdoor education became increasingly popular in the late 1960's because of a national concern for environmental quality (Smith, 1972).

A number of different national organizations have emerged in response to environmental education. The Outdoor Education Association was founded by L. B. Sharp in 1951. Julian Smith directed the Outdoor Education Project which was established in 1955 and in 1965, The Outdoor Education and Camping Council of AAHPER was organized. The Association for Environmental and Outdoor Education was Incorporated in the West in 1954 (Hammerman & Hammerman, 1973).

Environmental Education Acts

The popularity of environmental education gained national recognition and also the support of Congress (Environmental Education Acts, 1971; 1974; and 1978).

In 1971, the 91st Congress passed the original Environmental Education Act. Its purpose was to

establish education programs to ennance environmental quality and maintain ecological balance.

Environmental quality and preservation were a concern because many natural resources were being exploited to promote economic productivity. A need to gain respect for our environment through environmental education programs was presented to Congress.

As a provision of this act, a committee was formed to implement necessary action on the issue of environmental education. This committee focused on the ecological crisis tnat our country was facing due primarily to attitudes of the general public toward environmental degradation. It was determined that citizens should be provided with knowledge on environmental concerns to encourage more positive attitudes and actions.

The Committee appropriated funds to various organizations, agencies and institutions to promote environmental education programs. Some of the funds were used to develop curricula, provide training for teacners, community education, support existing programs, distribute materials by mass media, and plan outdoor ecological centers (Environmental Education Act, P.L. 91-1362, 1971).

In 1974, a second act was passed by the 93rd Congress to extend the Environmental Education Act for three years (Environmental Education Act, P.L. 93-278, 1974). The United States further extended the Environmental Education Act in 1978, with Public Law 95-561 which provided additions to the original Environmental Education Act passed in 1970. The act established an Office of Environmental Education within the U.S. Office of Education. Provisions for grants and contracts were also made available to agencies, organizations and institutions. Financial assistance to fund up to eighty per cent of the cost of a new program in its first year, technical assistance, and special grants were also supported through the act (Environmental Education Act of 1978, P.L. 95-561, 1978).

Environmental Education at the International Level

The United States was not alone in its concern for environmental education. The problem was also recognized on an international scale.

Belgrade International Environmental Workshop

The Belgrade International Environmental Workshop conducted in October 1975 was supported by the United Nations Educational, Scientific, and Cultural

Organization (UNESCO) (Berry, 1979). This was the first international effort in the area of environmental education which included the United States and many other nations. The Belgrade Charter, unanimously adopted at the end of the conference, set guidelines for world-wide cooperation in environmental education. Communication was also established among the nations in a quarterly newsletter entitled Connect (Hugnes-Evans, 1977). The participants, representing sixty-five nations including the United States, expressed a genuine concern and commitment to environmental education (Aldrich & Blackburn, 1977).

Intergovernmental Conference at Tbilisi

Another international milestone was reached in 1977 when the First Intergovernmental Conference on Environmental Education met in the Soviet Union in the city of Tbilisi. The United Nations Educational, Scientific and Cultural Organization (UNESCO) spent years planning this conference. One hundred forty-two UNESCO member nations, including the United States, attended the conference.

At this conference, environmental education was discussed on an international scale and recommendations were made to establish a national center on

environmental education to focus on environmental learning and teaching methods. It was also proposed that a course in environmental education be incorporated into teacher education curricula. Cooperation between education and environmental communities was viewed as having a positive impact (Berry, 1979).

Global 2000 Report

President Jimmy Carter ordered an investigation in 1977 to study the "probable changes in the world's population, natural resources, and environment through the end of the century" (Barney, 1980, p. iii). After extensive research by the Council on Environmental Quality, the Department of State and eleven other federal agencies, the Global 2000 Report was compiled and these conclusions were made:

> If present trends continue, the world in 2000 will be more crowded, more polluted, less stable ecologically, and more vulnerable to disruption than the world we live in now. Serious stresses involving population, resources, and environment are clearly visible ahead. Despite greater material output, the world's people will be poorer in many ways than they are today.

> For hundreds of millions of the desperately poor, the outlook for food and other necessities of life will be no better. For many it will be worse. Barring revolutionary advances in technology, life for most people on earth will be more precarious in 2000 than it is now--unless the nations of the world act decisively to alter current trends (Barney, 1980, p.1).

According to Moore, (1985) the environmental movement has seen direct effects from Global 2000. Memberships in environmental groups have increased dramatically and it has also helped to unite several environmental groups in a collective effort. Advantages of group cooperation were also seen on an international scale. An international commission was established by the United Nations Environmental Program to address the needs of global environmental issues.

Reactions to the report have helped environmental groups significantly increase their influence and the effects will eventually filter down though the education system. "The great majority of the world's people feel that education is the most powerful existing force for bringing about improvement and change" (Schmeider, 1977 p.32).

The Hudson Institute, a respected non-profit organization argues that the grim and gloomy predictions of the Global 2000 Report are unrealistic. A group of teachers met with Herman Kahn, a futurologist and chairman of the Hudson Institute, to debate this issue. The majority of teachers initially agreed with the predictions in the report but at the end of the week-long conference, many agreed with the view of the Institute which was much more optimistic. The Institute feels "that the next 100 years can and should be the most exciting and creative era in the world's history" (Melvin, 1983, p. 6).

In direct contrast to the Global 2000 Report, Simon and Kahn (1984) make these predictions:

> If present trends continue, the world in 2000 will be less crowded (though more populated), less polluted, more stable ecologically, and less vulnerable to resource-supply disruption than the world we live in now. Stresses involving population, resources, and environment will be less in the future than now . . . The world's people will be richer in most ways than they are today . . . The outlook for food and other necessities of life will be better . . . life for

most people on earth will be less precarious economically than it is now (p. 1-2).

Despite the criticism, the Global 2000 Report alludes to five other global studies that are generally consistent with its principal findings (Barney, 1980).

Positive Effects of Environmental Education

The effects of environmental education are noted by various sources.

Isenberg (1967) states in his paper a most important reality: "Outdoor education is not a specific course or separate area of study; it is a method of teaching. The rich resources of nature and outdoor activities can apply to all subject matter areas" (p. 4).

Isenberg (1967) also notes using natural resources and our environment gives children an ideal and readily available source of exploration, observation, and discovery. All children can benefit from environmental education and every subject area can be addressed. After students have participated in an outdoor program, teachers have noticed an observable positive change in their attitudes. They feel successful and their self-concepts have improved.

Environmental Programs within the District of Columbia

Positive effects of environmental education were seen in a school district which had a predominantly black population located within the District of Columbia. An environmental education camp was established where fifth grade students had the opportunity to participate in activities for five days in a total living and learning experience.

Students were given pre- and post-tests in the areas of opinions and knowledge. Gains were made in the areas of mathematics, science, and vocabulary. Positive gains were also noted in students' attitudes toward their environment. Teachers felt the effects from the environmental education experience were transferred to the classroom. Students were retaining information gained in the camp experience and they also expressed interests in other areas of science. They were also much more aware of their natural surrroundings and curiosity was increased (District of Columbia Public Schools, 1971).

Another environmental education program was established in the same geograpnic area. Round Meadow Environmental Laboratory School was integrated into the

District of Columbia public school system (Thomson, 1974). Sixth graders had the opportunity to experience outdoor studies including stream and woods ecology, geology, and the life of early settlers in a four day workshop.

Science and environmental awareness were the main goals of the lab school. Students experienced observing, identifying, collecting, researching, and conducting experiments with various elements of the environment.

When students returned to the classroom, teachers reported students demonstrated a new zest for learning. One teacher felt children got more from the experience at Round Meadow than from any ordinary year's classroom work in science.

Pennsylvania Environmental Education Program

Further evidence shows urban students demonstrate substantial gains from environmental education programs (Egan & Seidel, 1973).

In evaluating an environmental project using an interdisciplinary approach in Berks County, Pennsylvania, Egan and Seidel reported that students' knowledge about the environment improved along with a positive attitude towards the environment. The study

also indicated that urban students made more significant gains in these areas than rural students.

Goddard-Riverside Educational Camp Program

The New York City Board of Education implemented the Goddard-Riverside Educational Camp Program (Robin, 1976) for fifth grade students during the 1975-76 school year. The students were involved in a camp program lasting one week that provided activities and an intense learning atmosphere. Students used their own experiences with the environment and nature as a basis for gaining new knowledge. A criterion referenced pre-test in knowledge of scientific concepts was given prior to the camp experience.

The students wrote daily in journals about their experiences and their overall responses were very positive. The self-concepts of students seemed to improve and their attitudes toward learning improved also. A wide range of environmental activities were employed during the week but students were very receptive to the information they experienced.

The results from the post-test indicated an increasing knowledge of science. The data easily surpassed the .05 level degree of significant difference criterion. The project was seen as highly

successful in stimulating interests and motivating learning in natural sciences and in other academic areas as well.

Reading Improvement Program

Environmental education can branch out into other areas such as marine life. Gunther (1976) reports this program to be highly successful.

The Reading Improvement Through Marine Environment Exploration Program was also implemented in the New York City area. Students were selected by their principals on the basis of their need for improvement in reading. The program used a study of the environment to improve language arts and science skills.

One of the objectives of the experiment was to improve the students' abilities in perceiving relationships in science terminology and enable them to classify information. Students were also tested on constructing graphs, diagrams and tables. Both of these objectives were attained according to a criterion-reference test that was used as a pre- and post-test.

The program was viewed as being very successful in improving students' skills in the objectives mentioned

above but of possibly greater significance is that the environmental exposure also motivated students' voluntary exploration of their natural surroundings.

Many of the examples cited have been based upon the resident camp format. Environmental education can also be easily integrated into the regular curriculum.

Integrated Environmental Education Programs

Zipko (1980) concludes that for environmental education to have it's greatest effect, it must be integrated into the curriculum through an interdisciplinary approach. Children then begin to realize that environmental education is not just science but an all-encompassing subject.

Implementing environmental education into the daily curriculum would appear to be more appealing to some teachers. British Columbia school districts followed this school of thought and incorporated an environmental education strand into the curriculum (Conry & Jeroski, 1982).

British Columbia piloted a program in grades three, five, and seven. Teacher guides were developed for each of the lessons used from Project Learning Tree (Western Regional Environmental Education Council, 1977). Project Learning Tree (PLT) is an environmental

education guide which incorporates eighty-nine activities for grades K-6. The teachers were given packets so they could easily incorporate the lessons into their regular curriculum. At the conclusion of the study, students at grade five made the most significant gains on a science achievement test, according to pre- and post-test scores (Conry & Jeroski, 1982).

The academic effects of environmental education appear to be widespread but this thesis will deal specifically with environmental education's effect on students' attitudes toward the school curriculum in the areas of reading, math, science, and social studies.

Students' Attitudes Toward Science

It is essential for students to have a positive attitude toward science to become rational thinkers. They need to imitate the role of the scientist in understanding the scientific process (Blosser, 1984).

National Assessment of Educational Progress

According to Johnson (1981), in 1976-1977 the National Assessment of Education Progress (NAEP) conducted a study of 72,000 students to determine students' attitudes toward science. The results indicated that only half of the nine-year-olds tested

felt excited or successful in science and only six percent ranked science as their favorite subject. The attitude scores of thirteen and seventeen year-old students were lower than the nine-year-old students' scores.

The attitudes of teachers does apparently affect the way students perceive different subjects, but students do show positive feelings in certain areas of science. After conducting the NAEP study, Johnson (1981) states:

> Students' positive attitudes about environmental issues show a potential area for student interest in science that is overlooked by teachers. Nine-year-olds wanted to help solve serious environmental problems such as pollution, energy waste, disease, and food shortages, but their responses showed that they had little experience with environmental issues in school, had taken few field trips related to the environment, and had done few experiments (p. 40).

An update of the National Assessment of Educational Progress was done by the Minnesota Science

Assessment and Research Project in 1982 (Rakow, 1984). In the area of achievement, nine-year-olds scored one percentage point higher overall than was recorded in 1977. However, many of the process skills had declined over the five year period. The topics in which students showed the most growth were science-related social problems such as hunger, pollution and energy waste. It is ironic that the majority of elementary textbooks being used do not address these topics, therefore, it appears that students are gaining such knowledge from outside sources such as zoos and nature centers.

Scores on attitudes toward science declined slightly from 1977. It is unfortunate that by the time children are nine-years-old over half of them seem to be "turned off" to science. There was also a large number of students who felt incompetent in their ability to solve important science-related problems.

Minnesota Study

Similiar results to the NAEP study were found in an earlier test conducted in Minnesota in 1974 (Johnson, Ryan, & Schroeder, 1974).

This study was conducted in Minnesota comparing the effects of different teaching methods of science

and the attitudes of sixth grade students toward science. The same teacher taught all of the classes in the experiment devoting equal amounts of time to each class. The first group concentrated on the textbook primarily with library research, reports and filmstrips also being incorporated. The second group used the textbook but also participated in laboratory activities. The students in the third group were taught in an activity centered, open-ended inquiry situation.

The Minnesota study utilized the Projective Test of Attitudes (PTOA) to determine the students attitudes toward science. The results indicated that students in the third group who interacted with concrete materials developed significantly more positive attitudes.

Commitment to Science

The time we spend with students in each subject should be optimal learning time. Negative attitudes in a subject should not confound the learning process (Gerlovich, Downs, & Magrane, 1981).

Less time is being spent in the classroom on science and more time is being devoted to reading, writing, and mathematics due to the back-to-basics movement. This raises a critical issue since a report

in 1980, commissioned by the White House noted the push for science from the post-Sputnik era has seemingly reversed and we are now seeing a decline in our commitment for science (Fiske, 1979).

Summary

Environmental education has progressed rapidly during the last fifty years, however, it is critical that progress continues. Concentrated efforts of a few can change the lives and attitudes of many. The youth of today will be living in a different world than we do now if natural resources continue to be depleted without being replenished. Boulding (1985) reflects this situation in his statement:

> What formal education has to do is produce people who are fit to be inhabitants of the planet ... Otherwise (young people) are going to grow up and discover that we have taught them how to live in a world long gone (p. 16).

Environmental education instruction is having an effect on how students perceive their surroundings, and it is also affecting students' attitudes toward science and other areas of the curriculum (Thomson, 1974; Egan & Seidel, 1973; Robin, 1976; Gunther, 1976;

Conry & Jeroski, 1982). If environmental education instruction can have a positive impact on the treatment of the environment and how students perceive school, then it should be justified to incorporate more environmental education instruction into the curriculum.

CHAPTER 3

METHODS AND PROCEDURES

This chapter reports the methods and procedures used for collecting data and describing the sample population. It also explains the statistical design employed to test the following null hypotheses:

1. Environmental education instruction will have no effect on students' attitudes toward the school curriculum as measured by the Survey of School Attitudes (Hogan, 1975).
2. Environmental education instruction will have no effect on students' attitudes toward reading as measured by the Survey of School Attitudes (Hogan, 1975).
3. Environmental education instruction will have no effect on students' attitudes toward math as measured by the Survey of School Attitudes (Hogan, 1975).
4. Environmental education instruction will have no effect on students' attitudes toward science as measured by the Survey of School Attitudes (Hogan, 1975).
5. Environmental education instruction will have no effect on students' attitudes toward social studies as

measured by the Survey of School Attitudes (Hogan, 1975).

Procedures

The director of elementary education for School District #25, Dr. Harris Allen, was contacted to obtain permission to conduct the study. Once approval was given, the building principals of Bonneville, Chubbuck, Ellis, Indian Hills, Syringa, and Wilcox schools were contacted personally to obtain permission to present the research project to all interested intermediate grade teachers. After a presentation of the research proposal was made to the intermediate grade teachers, they decided whether or not to participate in the research. If the teachers wanted to participate, they committed their classroom either to the control or the experimental group. The decision to be in the control or experimental group was made by the individual teachers on a voluntary basis. A control group was included in the study as well as an experimental group to give a better perspective of the effects of the study. Teachers were given a letter explaining their involvement in their respective group (see appendices A and B).

The teachers who agreed to participate in the experimental group were provided with specific directions for administering tne Survey of School Attitudes (Hogan, 1975) test which includes sections on reading, mathematics, social studies, and science. The test was administered by the classroom teachers and scoring was done by this writer. Tnis test served as a pre-test of students' attitudes toward the curriculum, reading, math, science, and social studies as well as a post-test. Then the experimental teachers were provided with a set of twelve environmental activities (see appendix C) to be incorporated into their curriculum. They were asked to implement ten of these activities into their regular curriculum over a period of four weeks. After the students had been exposed to environmental education for the four week period, they were again given tne Survey of School Attitudes (Hogan, 1975) as a post-test.

The teachers in the control group administered tne Survey of School Attitudes (Hogan, 1975) as a pre-test to their students following the specific directions provided to them. The writer scored the pre-tests and after a four week period, the students in the control

group were given the same test as a post-test. Again, this writer scored the post-tests.

Sample

The student sample consisted of intermediate grade level classrooms of the teachers who volunteered from School District #25 in Pocatello, Idaho. Twenty-eight teachers volunteered to participate in the project, fourteen in the experimental group and fourteen in the control group. It was determined that the experimental and control group populations were similar initially by conducting a two-tailed independent t-test at the .05 level of confidence using the Statistical Packages for the Social Sciences (SPSS) (Hull & Nie, 1981) at the Computer Center of Idaho State University on the pre-test of the experimental and control groups to determine if the populations were similar at the .05 level of confidence. The results are analyzed in the following table.

Table 1 - Test of homogeneity between the experimental and control groups

	F Value	Degrees of Freedom	T Value	2 Tail Probability
Curriculum	1.13	607	-.14	.89
Reading	1.11	607	-.97	.33
Math	1.04	607	-.38	.71
Science	1.02	607	.50	.62
Social Studies	1.21	607	.46	.65

This would indicate that there were no significant differences between the control group and the experimental group before the research was conducted.

An informal assessment of the teachers' attitudes toward science which was adapted from a test used in the Biology Department at Idaho State University (see appendix D) was also used to assess homogeneity between the experimental and control teachers. An independent two-tailed t-test was conducted at the .05 level of confidence and the results are reported in the following table.

Table 2 - Test of homogeneity between teachers in the experimental and control groups

F Value	Degrees of Freedom	T Value	2-Tail Probability
1.55	21	.31	.76

These data indicate that there were no significant differences between the teachers' attitudes toward science in the experimental and control groups, therefore, the teachers were found to be homogeneous prior to conducting the study.

Due to reasons beyond this writer's control, four of the experimental teachers withdrew from the

experiment after the pre-test was given, consequently, no post-data for those particular classrooms were available. Evaluation was only done on classrooms with pre- and post-data. Data from the pre- and post-test were gathered from the fourteen classes in the control group classes. The sample size of the experimental group consisted of ten classrooms which represented 253 students. Two sixth grade classrooms, five fifth grade classrooms, and three fourth grade classrooms participated in the experimental group. Fourteen classrooms composed the control group with a population of 356 students. The control group consisted of four sixth grade classrooms, four fifth grade classrooms and six fourth grade classrooms. The total number of classrooms involved in the research was twenty-four and the total number of cases was 609 for the pre-test and 580 for the post-test. Students who were absent at the time of post-testing were not tested at a later date.

Limitations

The convenience sample of elementary schools was developed because of principals' knowledge of the project and their willingness to participate. Although this is not a random selection process of potential respondents, the geographic dispersion of the

elementary schools provides an acceptable level of heterogeneity among the student response. Findings can only be generalized to this group even though this represents an assumed cross-section of this student population in the Pocatello school district.

Various teaching styles and techniques were used in presenting the environmental education activities because of the individuality of the teachers. Since incorporating environmental education was a novelty for some of the classrooms, this may have influenced the results of the study.

The teachers volunteered to participate in the research which may have introduced bias. They were fully aware of the experimental and control groups. This factor may have impacted the study.

Instrument

The Survey of School Attitudes test by Thomas P. Hogan (1975) was used as a measure of students' attitudes toward the school curriculum and the specific subject areas of reading, math, science, and social studies. There are fifteen Likert-type questions for each specific subject area. The questions about the different subject areas are distributed throughout the test so the students answered the questions

independently instead of responding to a particular area. It is a group-administered test designed for grades 4-8. After preliminary instructions from the teacher, the students read and responded independently to each item. If the student had difficulty reading the items, the manual stated the teacher may provide assistance. There are sixty pictures which students responded to according to how they feel about what is happening in the picture. Each picture is accompanied by either a smile, a frown, or a neutral expression. The students indicate whether they like, dislike, or are neutral toward different activites in these curriculum areas.

Hogan (1975) reports an item analysis and standarization were based on a sample population of 13,500 students with diverse socio-economic characteristics. The testing was conducted in various geographic regions of the United States. The reliability of the test was based on the correlation coefficient and the standard error of measurement. The reliability has a median of .85 and ranges from .80 to .90. The four curriculum area coefficients were comparable and the standard error of measurement ranged from 2.3 to 2.7.

As reported by Hogan (1975), the test is not culturally or sex biased and a factor analysis of the items tended to support the construct validity of the scales. The scale is independent of and does not necessarily reflect student achievement. The validity and reliability evidence for the test were thus judged acceptable for an affective type of instrument for this study.

Statistics

A t-test was used to determine if there were significant differences between the pre-test and post-test scores of both the experimental and control groups using a 95 percent confidence level. The statistics were calculated using the Statistical Package for Social Sciences at the Computer Center at Idaho State University (Hull & Nie, 1981). T-tests were used to accept or reject each null hypothesis. A separate t-test was calculated to assess the students' attitudes in the following areas: (1) curriculum (combined scores of reading, math, science, and social studies), (2) reading, (3) math, (4) science, and (5) social studies.

CHAPTER 4

ANALYSIS OF DATA

The data from the experimental group and the control group are presented and analyzed in this chapter in terms of the following null hypotheses.

Null Hypothesis 1

Environmental education instruction will have no effect on students' attitudes toward the school curriculum.

An independent, two-tailed t-test was conducted utilizing the SPSS system to determine if there was a significant difference between the attitudes toward school of the control group and the experimental group. The results are summarized in Table 3.

Table 3 - Attitudes toward the school curriculum of experimental and control groups

F Value	Degrees of Freedom	T Value	2-Tail Probability
1.17	578	1.91	.06

These data would accept null hypothesis 1. This would indicate that environmental education instruction did not have an significant effect on students' attitudes toward the school curriculum at the .05 level of confidence. The exact two-tail probability of the

t-test for students' attitudes toward the curriculum was .056, however, the results were rounded to two digits since the .05 level of confidence was used. This figure demonstrates that students' attitudes made a positive change but it was not statistically significant.

T-tests between the post-tests of the experimental and control groups were calculated to determine if there were significant differences in attitudes in the subject areas of reading, math, science, and social studies.

Null Hypothesis 2

Environmental education instruction will have no effect on students' attitudes toward reading. The data are summarized in Table 4.

Table 4 - Attitudes toward reading of the experimental and control groups

F Value	Degrees of Freedom	T Value	2-Tail Probability
1.19	578	.79	.43

The null hypothesis is accepted for the subject area of reading.

Null Hypothesis 3

Environmental education instruction will have no effect on students' attitudes toward math.

Table 5 - Attitudes toward math of the experimental and control groups

F Value	Degrees of Freedom	T Value	2-Tail Probability
1.04	578	1.20	.23

According to these data, null hypothesis 3 would be accepted.

Null Hypothesis 4

Environmental education instruction will have no effect on students' attitudes toward science.

Table 6 - Attitudes toward science of the experimental and control groups.

F Value	Degrees of Freedom	T Value	2-Tail Probability
1.12	578	2.51	.01

At the .05 level of confidence, null hypothesis 4 would be rejected. Teaching environmental education

did have a positive effect on students' attitudes toward science.

Null Hypothesis 5

Environmental education instruction will have no effect effect on students' attitudes toward social studies.

Table 7 - Attitudes toward social studies of experimental and control groups.

F Value	Degrees of Freedom	T Value	2-Tail Probability
1.02	578	2.02	.04

Null hypothesis 5 would be rejected at the .05 level of confidence, thus, environmental education instruction did have a positive effect on students' attitudes toward social studies.

Summary

The following table will summarize the information gathered in this study from the t-tests conducted in relation to the null hypotheses.

Table 8 - Summary of students' attitudes

Null Hypothesis	Subject Area	Results
1	Curriculum	accept
2	Reading	accept
3	Math	accept
4	Science	reject
5	Social Studies	reject

CHAPTER 5

SUMMARY, CONCLUSIONS, RECOMMENDATIONS, AND IMPLICATIONS

Summary

The purpose of this study was to determine if incorporating environmental education instruction into the curriculum would have a positive effect on students' attitudes toward the school curriculum and specifically in the subject areas of reading, math, science, and social studies. The statistical data comparing the control and the experimental groups indicated the students in the experimental group had a more positive attitude towards science and social studies after experiencing environmental education instructional activites.

Conclusions

On the basis of the statistical data that were analyzed, it is concluded that environmental education instruction can improve the attitudes of students toward the subject areas of science and social studies.

It is concluded that environmental education instruction can be successfully implemented into the school curriculum that already exists. The intent of the environmental education instructional packet was to

provide teachers with activities which could be incorporated into various curriculum areas such as science, math, physical education, fine arts, social studies, and language arts. The extent to which teachers integrated the activities into the existing curriculum was not formally monitored, however, by talking informally with the teachers the activities were successfully incorporated.

The majority of the students in the experimental group responded favorably to the activity-oriented lessons when they were active participants. The positive feedback from the experimental teachers alluded to this conclusion.

Recommendations

The writer would suggest that further research should be conducted on the effects of environmental education instruction on the attitudes of fourth, fifth, and sixth grade students toward the school curriculum.

It is recommended that environmental education instruction be integrated into the existing school curriculum based on the data in this study which indicated that students' attitudes in the subject areas

of science and social studies were improved when environmental education was incorporated.

Implications

This research was conducted to determine whether students in the fourth, fifth, and sixth grades who have had environmental education education instruction have a more positive attitude toward the school curriculum than those who have not. If incorporating environmental education instruction into the curriculum for only a limited period of time can improve students' attitudes significantly in the subject areas of science and social studies, then environmental education instruction could possibly improve attitudes in other subject areas if used over a longer period of time.

Various authors (Conry & Jeroski, 1982; Egan & Seidel, 1973; Robin, 1976; Thomson, 1974) have suggested that after experiencing environmental education, students may develop more responsible and concerned attitudes t ward the environment. By integrating environmental education into the existing curriculum, students can be exposed to concepts that may change their lives.

Although my data does not suggest this, the writer feels that environmental education is not just a

subject but an attitude that needs to be developed. This attitude is not just towards school but towards life and preserving our environment. Students may become responsible and informed citizens who can see the relevance of environmental issues in their personal lives. The responsibility and future of our environment cannot be left to only a few, it must be a global conscious effort. Developing a sensitive awareness and appreciation of the environment can be one of the most powerful tools the education system can provide.

APPENDIX A

APPENDIX A

1495 Troy Lane
Pocatello, ID 83202
September 24, 1986

Dear Teacher,

I am a graduate student at Idaho State University currently working on my thesis entitled "Environmental Education and Its Effects on Students' Attitudes Toward School". My procedure will basically involve three steps:

1. Pre-test students' attitudes toward school.
2. Teachers will incorporate ten environmental education lessons into their curriculum over a four week period.
3. Post-test students' attitudes toward school.

Since I have taught five years in the fifth grade at Chubbuck Elementary, I know how busy you are so I will try to make this a very positive experience. I will provide all of the materials for you including the pre-test, mini-curriculum, and post-test. I will collect the tests after you have administered them and I will do the scoring. The results will be provided to you when the project is completed. All of the activities will take thirty minutes or less and can be easily incorporated into the subjects that you are already teaching in your curriculum. You may keep the mini-curriculum of environmental education activities for your own use at the conclusion of the experiment.

I hope you and your students will be willing to participate in this project. Please complete the "Science Attitude Scale" if your class would like to participate. The instruction period will be during the month of October and I will be contacting you about the materials you will need. Thank you for your cooperation and participation.

Sincerely,

Denece G. Schwartz
Graduate Assistant

APPENDIX B

APPENDIX B

1495 Troy Lane
Pocatello, ID 83202
September 29, 1986

Dear Teacher,

I am a graduate student at Idaho State University currently working on my thesis. I am conducting a study on student attitudes toward school and I am requesting permission to use the students in your class in my research. The procedure will include administering a pre-test and then administering the same instrument as a post-test after a four week period. I will be responsible for scoring the pre- and post-tests, since I know how busy teachers' schedules are. The results of your class will be available to you after the research is completed.

I hope you and your students will be willing to participate in this research. Please complete the "Science Attitude Scale" if your class would like to participate. I will provide all of the testing materials that are required. Thank you for your cooperation and participation.

Sincerely,

Denece G. Schwartz
Graduate Assistant

APPENDIX C

APPENDIX C

SUMMARY OF ACTIVITIES

Activities taken from Project Learning Tree (PLT), (Western Regional Environmental Education Council, 1977).

Name of activity - Invent-A-Game
Source - PLT #26, p. 41
Subject areas - Physical education, science
Description - Students use natural objects to invent a game or play familiar games.

Name of activity - Leaf Prints
Source - PLT #9, p. 15-16
Subject areas - Fine arts, science
Description - Various leaves are used in different art projects. This helps students to be aware of the different sizes and shapes of leaves and be able to differentiate among them on the basis of these characteristics.

Name of activity - Sunlight and Shades of Green
Source - PLT #61, p. 99
Subject area - Science
Description - Students learn how the lack of sunlight effects plant leaves by conducting an experiment.

Name of activity - Why Wooden Pencils?
Source - PLT #55, p. 89
Subject areas - Social studies, science, language arts, humanities
Description - Students categorize materials as renewable and nonrenewable resources and discuss the suitability of materials for consumer products.

Activities taken from Project WILD (Western Association of Fish and Wildlife Agencies & Western Regional Environmental Education Council, 1983).

Name of activity - Animal Charades
Source - Project WILD, p. 3-4
Subject areas - Science, drama
Description - By playing charades, students distinguish between wild and domesticated animals.

Name of activity - Bearly Born
Source - Project WILD, p. 5-8
Subject areas - Math, science
Description - Similiar survival needs of bears and human babies are compared. Differences between humans and bears at various stages of maturity are illustrated, computed, and graphed.

Name of activity - Habitat Lap Sit
Source - Project WILD, p. 33-34
Subject areas - Science, physical education
Description - By physically forming an interconnected circle representing a habitat, students discover the components of a habitat and how they are dependent upon each other.

Name of activity - On Deer!
Source - Project WILD, p. 131-134
Subject areas - Science, math, social studies, physical education
Description - Students become "deer" in this activity to help them identify components of a habitat and their importance. It also helps them understand the balance of nature in wildlife populations.

Name of activity - Stormy Weather
Source - Project WILD, p. 25-27
Subject areas - Language arts, science, social studies
Description - This "guided imagery" activity allows students to recognize the shared experiences of humans and wildlife in the environment.

Activities taken from Outdoor Biological Instructional Strategies (OBIS), (Delta Education, 1981).

Name of activity - Food Chain Game
Source - OBIS
Subject areas - Physical education, science
Description - This activity helps students understand the concept of population and the parts of a food chain.

Name of activity - Silent Stalking
Source - OBIS
Subject areas - Physical education, science, social studies
Description - Students learn the importance of keen hearing and silent stalking skills for both predators and prey.

Name of activity - Sticklers
Source - OBIS
Subject areas - Physical education, science
Description - The concept of habitat and distribution are demonstrated in this simulation game.

APPENDIX D

APPENDIX D

SCIENCE ATTITUDE SCALE

NAME _____

SCHOOL _____

GRADE _____ NUMBER OF STUDENTS _____

The following is a survey to determine teachers' attitudes toward science. Each of the statements below expresses a feeling toward science. Please rate each statement on the extent to which you agree. After you have made your choice, record your response in the blank by the number.

For each statement 1-16 you may
A - strongly agree
B - agree
C - undecided
D - disagree
E - strongly disagree

_____1. Science is very interesting to me.
_____2. I don't like science, and it scares me to teach it.
_____3. I am always under a terrible strain teaching a science class.
_____4. Science is fascinating and fun.
_____5. Science makes me feel secure, and at the same time it is stimulating.
_____6. Science makes me feel uncomfortable, restless, irritable, and impatient.
_____7. In general, I have a good feeling toward science.
_____8. When I hear the word science, I have a feeling of dislike.
_____9. I approach science with a feeling of hestitation.
_____10. I really like science.
_____11. I have always enjoyed studying science in school and college.
_____12. It makes me nervous to even think about doing a science experiment.
_____13. I feel at ease in science and like it very much.
_____14. I feel a definite positive reaction to science; it's enjoyable.
_____15. I feel that I haven't had adequate training to teach science.
_____16. My students seem to like science.

Next Page, Please

Below are some scales on which you should rate your feelings toward science. Some of the scales seem to make more sense than others. Don't worry about it. Just rate your feelings toward science on each scale as best you can. Please don't leave any scales blank.

On each scale, depending on which side of each scale you favor, rate your feelings as A, B, C, D, or E. Circle your response.

SCIENCE IS:

17. Good.....A B C D E.....Bad
18. Clean..... A B C D E.....Dirty
19. Worthless.. A B C D E.....Valuable
20. Cruel.....A B C D E.....Kind
21. Pleasant....A B C D E.....Unpleasant
22. Sad.....A B C D E.....Happy
23. Nice.....A B C D E.....Awful
24. Fair.....A B C D E.....Unfair

Thank you for your participation.

The information on this survey will be confidential.

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